WASHINGTON STATE DEPARTMENT OF ECOLOGY
DAM SAFETY OFFICE

SIMPLIFIED EMERGENCY ACTION PLAN FORM

EMERGENCY ACTION PLAN

Project Name: _____

DSO File Number:_____

Location:_____
(Town, County, Stream)

OWNER:_____

ISSUE DATE:_____

REVISED DATE:_____

INTRODUCTION

This Emergency Action Plan (EAP) defines responsibilities and provides procedures designed to:

- Identify unusual and unlikely conditions which may endanger the dam.
- Initiate remedial actions to prevent or minimize the downstream impacts of a dam failure.
- Initiate emergency actions to warn downstream residents of impending or actual failure of the dam.

Official Dam Name:

Located on: _____ Creek/River

Section _____ Township _____ Range _____ W.M.

Dam Owner and Operator:

Type of Dam:

Dam Height: _____ Crest Length: _____ Crest Width:

Downstream Flood Path: _____ Creek/River to _____ Creek/River
to _____ River, etc.

Downstream Hazard Classification:

Number of Homes in the Floodplain

Downstream Property Description:

NOTIFICATION FLOWCHART

If a **failure is imminent or in progress**, downstream evacuation of the floodplain must be started immediately in accordance with the following:

1. Notify persons immediately downstream from the dam of the failure;
2. Contact Local County or City Emergency Services Dept. or Sheriff
3. Contact State Dam Safety Office and begin any recommended procedures;
4. Take preventive actions described on pages 8-9 of this plan;

A. Persons Downstream First Affected by Flood Waters

Name	Address	Phone	No. of Residents

1._____

_____

_

2._____

_____

_

3._____

_____

4._____

_____

_

5._____

_____

_

6._____

B. County/City Emergency Services or Sheriff

	Name	Position	Phone
1.			
2.			

C. Department of Ecology Dam Safety Office

	Name	Position	Address	Phone
1.	Doug Johnson	Supervisor Dam Safety	PO Box 47600 Olympia WA 98504	(360)407-6623 (Office) (360) 971-6347 (Beeper)
2.	Jerald LaVassar	Geotechnical Engineer	" " " "	(360)407-6208 (Office) (360)456-1370 (Home)

D. State Division of Emergency Management

Duty Officer (24 Hours) 1-800-258-5990

SLOWLY DEVELOPING FAILURE OR UNUSUAL SITUATION

If there is a **slowly developing failure** or **unusual situation**, where failure is not imminent, but could occur if no action is taken, dam tending personnel should:

- Notify Local Emergency Services (_____) _____ of the potential problem and keep them advised of the situation.

- Contact the Washington State Department of Ecology, Dam Safety Office (DSO) at (360) 407-6208 for an evaluation of the dam.

- During these contacts, find out if there are any immediate actions that can be taken to reduce the risk of failure.

- If necessary, implement preventative actions described on pages 8-9 of this plan.

- **If situation deteriorates, be prepared to implement Notification Flowchart on Page 3!!!!**

POSSIBLE EMERGENCY CONDITIONS

Listed below are some, not necessarily all, of the events which can lead directly to the failure of the dam. Included after each one is a brief outline of steps to take in trying to stabilize the situation.

EARTHQUAKE:

If an earthquake of Richter Magnitude 5.0 or greater has been reported in the vicinity, or the responsible individual(s) has felt ground motions and experienced damage a large earthquake characterized by the following:
"Felt by all. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books etc. knocked off shelves. Furniture moved or overturned. Weak plaster and masonry cracked. Trees bushes shaken visibly, or heard to rustle."

1) Immediately conduct a general overall visual inspection of the dam.
2) If the dam is failing, or is damaged to the extent that there is increased flow passing downstream, immediately implement **NOTIFICATION FLOWCHART** procedures.
3) Check the dam crest for settlement. If the dam crest has dropped more than 0.5 feet, lower the reservoir pool level the same amount as the settlement. If the outlet works are damaged, it may be necessary to install siphon pipes or pumps to lower the pool level. The pool should remain drawn down until the dam can be examined by the DSO or other qualified professional engineers.
4) Otherwise, if damage has occurred, but is not judged serious enough to cause failure of the dam, quickly observe the nature, location, and extent of the damage, and evaluate the potential for failure. Then contact the Department of Ecology, Dam Safety Office at (360) 407-6208, or if after hours, contact the State Military Department, Division of Emergency Management at (800) 258-5990 for further instructions. Also contact Local Emergency Management Office at (____)_____. A description of slides, sloughs, new or increased seepage, and sudden subsidence, including the location, extent, rate of subsidence, effects on adjoining structures, springs or seeps, reservoir elevation, prevailing weather conditions, and other pertinent facts would also be helpful.
5) If there appears to be no imminent danger of dam failure the dam owner should thoroughly inspect the following:
    a) both faces of the dam for cracks, settlement, or seepage;
    b) abutments for possible displacement;
    d) spillway structure to confirm continued safe operation;
    e) outlet works, control house, tunnel, and gate chamber for structural integrity;
    f) drains and seeps for any turbidity, muddy water or increased flow;
    g) spillway structure for continued safe operation;
    h) reservoir and downstream areas for landslides;

Report all findings to the DSO and all other agencies that had been contacted earlier during the emergency. Also make sure to keep close watch on the dam for the next two to four

weeks as some damage may not show up immediately after the quake.

FLOODING:

Routing of the Inflow Design Flood indicates that the spillway _will / won't_ handle the expected runoff without problems. However, if during a major flood event something should happen to cause the reservoir level to rise within _2_ feet of the dam crest, or elevation ____ ft, contact the DSO and County Emergency Services immediately to report the following:

a) current reservoir elevation and freeboard;
b) rate the reservoir is rising;
c) weather conditions - past, present, predicted;
d) discharge conditions of creeks and rivers downstream;
e) the rate of seepage from the drains.

******ANY TIME THE WATER IN THE RESERVOIR EXCEEDS THE MAXIMUM
***** NORMAL LEVEL OF OPERATION, OR ELEVATION _____feet,
DAILY INSPECTIONS OF THE DAM ARE REQUIRED

If the reservoir level reaches within _1_ foot of the dam crest, or elevation _____feet, immediately implement the following procedures:

a) Contact Local Emergency Management/Services (____)_____ and the Dam Safety Section (360)407-6623 or (360)407-6208.
b) Gradually increase discharge through the spillway and/or outlet works, if possible.
c) Try to notify downstream residents of the increases in discharge, and increase the discharge in stages to avoid trapping downstream residents. _____ is responsible for operating the outlet to release the floodwaters).
d) Check downstream toe and abutments for any new seepage or abnormal toe drain leakage. If there is any indication of muddy or silty flow, and/or the flow is increasing, implement **NOTIFICATION FLOWCHART**.
e) Check for increased/decreased seepage due to a change in water level.
f) Check for cracks, slumping, sloughing, sliding, or other distress signals near the dam abutment or crest.

EROSION, SLUMPING/SLOUGHING, OR CRACKING OF THE DAM OR ABUTMENT

Determine the location, size of the affected area(s) (height, width, and depth) severity, estimated seepage discharge, clear or cloudy seepage, and the reservoir and tailwater elevations. If failure appears likely, immediately implement **NOTIFICATION FLOWCHART** procedures; otherwise, contact the Dam Safety Office for instructions.

NEW SPRINGS, SEEPS, BOGS, SANDBOILS, INCREASED LEAKAGE, OR SINKHOLES

If there is a rapid increase in old seeps, an increase in toe drain flow, or if new springs, seeps, or bogs appear, then one should determine the location, size of the affected area, estimated discharge, nature of the discharge (clear or cloudy), and reservoir and tailwater elevations (a map of the area may be helpful to illustrate where the problem is located). If failure appears likely, implement **NOTIFICATION FLOWCHART** procedures; otherwise, report all findings to the Dam Safety Section and wait for further instructions.

SUDDEN WATER RELEASES

In case of sudden, planned or unplanned, large water releases from the outlet works or spillway (e.g. opening gates or valves, pulling stoplogs), notify downstream residents and the appropriate agencies of the increased flow.

ABNORMAL INSTRUMENTATION READINGS

After taking any instrumentation reading, compare the current readings to previous readings of the same reservoir level. If the reading appears abnormal _____ is responsible for:

1) Determining:
    a) changes from the normal readings;
    b) reservoir and tailwater elevation;
    c) weather conditions;
    d) other pertinent facts.

2) Contacting the dam owner, project engineer, and the DSO.

OTHER PROBLEMS

In case of other problems occurring that might pose a threat to the dam safety, contact the DSO and explain the situation as best as possible.

END OF EMERGENCY SITUATION AND FOLLOW-UP ACTIONS

Once conditions indicate that there is no longer an emergency at the dam site and the proper authorities (e.g. Department of Ecology - Dam Safety Office, or a professional engineer) have declared the dam safe, _____ should contact the local emergency management authorities who will then terminate the emergency situation.

PREVENTATIVE ACTIONS TO BE TAKEN

The following actions describe some of the steps that could be taken at the dam to prevent or delay failure after an emergency is first discovered. **These actions should only be performed under the direction of the DSO, or other qualified professional engineers.**

ACTIONS TO BE TAKEN IN THE EVENT OF:

Overtopping by Flood Waters:

a) Open outlet to its maximum safe capacity.
b) Place sandbags along the dam crest to increase freeboard and force more water through the spillway and outlet.
c) Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other materials over eroding areas.
d) Divert flood waters around the reservoir basin if possible.

Reduction in Freeboard and/or Loss of Dam Crest Width:

a) Place additional rip rap or sandbags in damaged areas to prevent further embankment erosion.
b) Lower the water level to an elevation below the damaged area.
c) Restore freeboard with sandbags or earth and rockfill.
d) Continue close inspection of the damaged area until the storm is over.

A Slide on the Upstream or Downstream Slope of the Embankment:

a) Lower the water level at a rate, and to an elevation, that is considered safe given the slide condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.
b) Restore lost freeboard if required by placing sandbags or filling in the top of the slide.
c) Stabilize slides on the downstream slope by weighting the toe area with additional soil, rock, or gravel.

Erosional Seepage or Leakage (Piping) through the Embankment, Foundation, or Abutments:

a) Plug the flow with whatever material is available (hay bales, bentonite, or plastic heeting if the entrance to the leak is in the reservoir).
b) Lower the water level until the flow decreases to a non-erosive velocity or until it stops.
c) Place a blanket filter (a protective sand and gravel filter) over the exit area to hold

materials in place.

d) Continue lowering the water level until a safe elevation is reached.

e) Continue operating at a reduced level until repairs are made.

A Failure of an Appurtenant Structure such as an Outlet or Spillway:

a) Implement temporary measures to protect the damaged structure, such as closing an outlet or providing temporary protection for a damaged spillway.

b) Employ experienced, professional divers, if necessary, to assess the problem and possibly implement repair.

c) Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.

A Mass Movement of the Dam on its Foundation (Spreading or Mass Sliding Failure):

a) Immediately lower the water level until excessive movement stops.

b) Continue lowering the water level until a safe level is reached.

c) Continue operation at a reduced level until repairs are made.

Excessive Seepage and High Level Saturation of the Embankment:

a) Lower the water to a safe level.

b) Continue frequent monitoring for signs of slides, cracking, or concentrated seepage.

c) Continue operations at a reduced level until repairs are made.

Spillway Backcutting Threatening Reservoir Evacuation:

a) Reduce the flow over the spillway by fully opening the main outlet.

b) Provide temporary protection at the point of erosion by placing sandbags, rip rap materials, or plastic sheets weighted with sandbags.

c) When inflow subsides, lower the reservoir to a safe level.

d) Continue operating at a lower water level in order to minimize spillway flow.

Excessive Settlement of the Embankment:

a) Lower the water level by releasing it through the outlet or by pumping, or siphoning.

b) If necessary, restore freeboard, preferably by placing sandbags.

c) Lower water to a safe level.

d) Continue operating at a reduced level until repairs can be made.

SUPPLIES AND RESOURCES

In an emergency situation, equipment and supplies might be needed on short notice, such as sandbags, rip rap, fill materials, equipment, and laborers. The table below lists the supplies and indicates how to access them.

Item	Contact	Location
Earthmoving Equipment	_____	_____
Sand and Gravel	_____	_____
Sandbags	_____	_____
Pumps	_____	_____
Pipe	_____	_____
Laborers	_____	_____
Other	_____	_____

INDIVIDUALS RESPONSIBILITIES

The following list indicates who is responsible for taking specific actions at the dam when there is an emergency situation. In this manner tasks can be well divided so in an emergency no one person is overwhelmed beyond functioning adequately.

Name	Telephone	Responsibility
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

APPROVAL OF THE PLANS

The undersigned persons have reviewed this Emergency Action Plan and concur with the proposed notification procedures.

Dam Owner: _____

Dam Operator: _____

Local Emergency Services: _____

Dam Safety Office: _____

Other: _____

INUNDATION MAPS

_____ homes could be affected by a major flood caused by a sudden breach of ____dam. These homes are marked on the following inundation map. Flood waters would reach the first home approximately _____ minutes after the dam failure.

Place Inundation Map Here